Séminaire commun

Quantum Aspects of Null Raychaudhuri

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LPENS – Conf IV-E244, 24 Rue Lhomond and Zoom

Résumé

After deriving the null Raychaudhuri equation on an arbitrary null hypersurface from the intrinsic Carrollian geometry, we construct the phase space and Poisson brackets. Thanks to ultra-locality - that we thoroughly discuss -, the system can be canonically quantized on each null generator. If there is no infalling radiation, the gravitational degrees of freedom behave as a curved beta-gamma CFT, whose central charge counts the number of null generators. We then go to a regime of the parameters named perturbative quantum geometry, in which we can quantize both radiative and Coulombic data. We compute the TT OPE of the stress tensors of each sector, showing that they satisfy a Virasoro algebra with positive central charges. This implies that, at the quantum level, the Raychaudhuri equation can be anomalous. Time permitting, we propose a new regime of gravity, called mesoscopic quantum gravity, where the central charge is finite.